

## WHAT WILL A GEOLOGIC REPOSITORY BE LIKE?

### Part I

**Directions:** Put the number of the phrase or term from column B in the space provided next to the appropriate item in column A.

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| <p><u>7</u> A. substantially complete waste containment by waste package</p> <p><u>13</u> B. Yucca Mountain, Nevada</p> <p><u>12</u> C. geologic repository resembles</p> <p><u>1</u> D. total land required for a repository</p> <p><u>8</u> E. land required for above ground facilities</p> <p><u>11</u> F. land required for subsurface facilities</p> <p><u>9</u> G. manmade barrier</p> <p><u>10</u> H. surface facility</p> <p><u>4</u> I. will move waste to underground facility</p> <p><u>3</u> J. main access tunnel</p> <p><u>5</u> K. when repository will be closed</p> <p><u>2</u> L. depth beneath surface for disposal</p> | <p>facilities</p> <p>1. <u>2,307 hectares</u> (5,700 acres)</p> <p>2. about <u>305 meters</u> (1,000 feet)</p> <p>3. ramp</p> <p>4. shielded transport vehicle</p> <p>5. at least 50 years after emplacement begins</p> <p>6. electric train</p> <p>7. 300 to 1,000 years</p> <p>8. <u>61-162 hectares</u> (150 to 400 acres)</p> <p>9. disposal container</p> <p>10. used for handling waste</p> <p>11. about <u>567 hectares</u> (1,400 acres)</p> <p>12. large mining complex</p> <p>13. candidate site to be studied for a repository</p> <p>14. at least 100 years after disposal begins</p> <p>15. 10,000 years</p> |
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## Part 2

**Directions:** Use the reading lesson *What Will a Geologic Repository Be Like?* to answer the following questions in the spaces provided.

1. What Federal Government agencies will regulate a nuclear repository?

*(Nuclear Regulatory Commission and Environmental Protection Agency)*

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2. Describe the facility of a geologic repository.

Above ground:

*(Resembles mining complex; 2,307 hectares (5,700 acres); 5 kilometers (3-mile) controlled area surrounding perimeter; roads and rail line coming in. Waste handling; utility buildings; fire and medical stations; administrative offices; repair shops; water and sewage treatment plants; warehouse; security posts.)*

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Below ground:

*(Sloping ramps to subsurface area; main access tunnels; and disposal areas.)*

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3. What are the three components of the multiple barrier system?

*(The waste form, the repository, and the geologic medium—host rock.)*

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4. Describe the waste form for spent fuel. How does its form act as a barrier to releases of radioactivity?

*(Spent fuel assemblies consisting of fuel rods holding ceramic pellets; metal used for fuel rods is corrosion and heat resistant. In this form the waste package resists external water damage from the heat produced by the decaying waste.)*

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5. Describe the waste form for high-level waste from defense activities. How does its form act as a barrier to releases of radioactivity?

*(Waste is immobilized in borosilicate [boron and silicon] glass, which resists corrosion and contains radioactive material.)*

6. What are advantages of glass for immobilizing waste?

*(The glass form selected is made of the elements boron and silicon. It is stable, strong enough to resist stresses of disposal, withstands leaching, and is suitable for large-scale, remote production.)*

7. What materials are being considered for the disposal containers? Why?

*(Corrosion resistant materials under consideration are carbon steel, stainless steel, copper-based alloys.)*

8. What are the two main reasons that boreholes and shafts will be sealed?

*(To prevent or minimize water migration and thwart human intrusion.)*

9. Explain ways in which any geologic site can act as part of the multiple barrier system.

*(The host rock/geologic medium can provide strength for the mine and containment for the waste; retard movement of water to and away from repository; conduct heat from disposal container; and contribute to slowing movement of contaminants to accessible environment.)*

10. List and explain three features of the Yucca Mountain site that might help to ensure that waste would remain isolated from the accessible environment if a repository were built there.

*(Tuff is durable; repository would be in an unsaturated zone away from water table; zeolites could "filter" waste water, removing contaminants.)*